

**Remarks**

**A. Pending Claims**

Claims 1-36 are pending. Claims 1, 2, 26, and 36 have been amended.

**B. Objection**

Claim 2 was objected to under 37 C.F.R. §1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. The Office Action states, “Claim 1 states that the opening contains simulated decay material.” Applicant respectfully disagrees.

Amended claim 1 states “wherein the cavity comprises: an opening... and simulated decay material in a portion **of the cavity**” (emphasis added). Claim 2 states, “wherein a portion **of the opening** contains simulated decay material” (emphasis added).

Applicant’s Specification states, “Simulated decay material may be applied to a cavity, including the opening and/or one or more grooves.” (Specification, page 7, lines 10 and 11).

Amended claim 2 further modifies claim 1 by requiring simulated decay material in a portion of the opening, which is more specific than the claim 1 requirement of decay material in a portion of the cavity. Applicant respectfully requests removal of the objection to claim 2.

**C. The Claim Meets The Written Description Requirement Pursuant To 35 U.S.C. §112, First Paragraph**

Claim 20 was rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Applicant respectfully disagrees with the rejection.

Claim 20 states, “wherein the simulated decay material is detectable by caries detecting stain.”

Applicant's Specification states:

Simulated decay material may include a resin. In an embodiment, the resin is non-hardening. The resin may be any material approved for use by the American Dental Association of suitable texture (i.e., consistency) to simulate human dental caries. The resin may be heat cured and/or chemically cured. In an embodiment, the resin may be cured with light. The resin may be radio-opaque or radiotranslucent. Tempit® L/C, manufactured by Centrix Incorporated (Shelton, Connecticut), a resin which tends to stay pliable after curing, may be used in simulated decay material. Properties of the resin may allow the simulated decay material to be removed from a tooth with an excavator or other dental instrument. In an embodiment, caries detecting stain may be used to check for complete removal of simulated decay material in a pre-clinical setting.

Tempit® L/C, which is disclosed in the specification, is a simulated decay material for which caries detecting stain may be used to check for complete removal in a pre-clinical setting. Providing a product and a manufacturer of simulated decay material with desired properties is believed to be sufficient to conform to the enablement requirement. Applicant respectfully requests the removal of the rejection of claim 20.

**D. The Claims Are Not Anticipated By Vigg Pursuant To 35 U.S.C. §102(b)**

Claims 1, 2, 5-7, 11, 12, 17, 21-23, and 36 were rejected as being anticipated by U.S. Patent No. 2,750,670 to Vigg (hereinafter "Vigg"). Applicant respectfully disagrees with these rejections.

The standard for "anticipation" is one of fairly strict identity. A claim can only be anticipated if each and every element set forth in the claims is found to be either expressly or inherently described in the cited art. *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 728, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), MPEP §2131.

The Office Action states:

Claims 1 and 36: Vigg discloses a model of dental caries, comprising: an artificial tooth (*Figs 3 and 4*), wherein the artificial tooth comprises a cavity (57), and wherein the cavity comprises: an opening that extends from an exterior surface of the artificial tooth to at least a simulated dentinoenamel junction of the artificial tooth; and wherein the opening extends along at least a portion of the simulated dentinoenamel junction (*Figs. 3 and 4, A cavity can extend from the exterior of the tooth through the enamel to the dentin, as shown.*); and simulated decay material in the cavity (*col. 5, 27-48; A cavity can be filled with simulated decay material*).

Claim 1 describes a combination of features of a model dental caries that includes, but is not limited to, the features of: “simulated decay material in a portion of the cavity” (emphasis added). Support for the amendment is found at least in FIGs. 5 and 8 and in Applicant’s Specification, which states: “Simulated decay material may be applied to a cavity, including the opening and/or one or more grooves.” (Specification, page 7, lines 10 and 11). FIGs. 5 and 8 depict the cavity with opening 102 and simulated decay material 114.

Vigg does not appear to teach or suggest at least the above-quoted features of claim 1. Vigg appears to teach molding a cavity in a cap or in a dentine-simulating member. The molded surface of dentine-simulating member is then **completely filled or packed** with plastic material. As shown in Figs. 3 and 4 of Vigg, the plastic material appears to extend from the dentine-simulating member to upper surface of the enamel. Vigg states:

For demonstration, study or operative purposes, there may be formed in certain model teeth, or in replacements therefor, decay simulating portions positioned and shaped to be typical of commonly observed decay conditions. Such portions are designated in Figs. 3 and 4 by the numeral 57 and can represent cavities molded in the cap 52, in the dentine-simulating member 48, or both.  
(Vigg, column 5, lines 37-44).

Vigg also states:

This mold is then **filled** with plastic material, producing an enamel-simulating cap 52 adhering to the dentine-simulating member 48 and shaped in its exterior and in its grinding surface 53 to corresponds to the natural tooth. The enamel-simulating cap 52 surrounds the crown 50 and extends to a position just below the point of initial contact with the lip 39 of the gum-simulating member.  
(emphasis added) (Vigg, column 5, lines 23-29).

As such, the features of claim 1 including, but not limited to, the features of: “simulated decay material in a portion of the cavity” does not appear to be taught or suggested by Vigg. Applicant requests removal of the anticipation rejection of claim 1 and the claims dependent thereon.

Many of the dependent claims include features that are not taught or suggested by Vigg. Claim 2 states in part, “wherein a portion of the opening contains simulated decay material.” Vigg does not appear to teach or suggest the above-quoted feature, in combination with the other features of the claim.

Claim 5 states in part, “wherein the artificial tooth comprises resin.” The above-quoted feature of claim 5, in combination with the other features of the claim, does not appear to be taught or suggested by Vigg.

Claim 6 states in part, “wherein the artificial tooth comprises melamine resin.” The above-quoted feature of claim 6, in combination with the other features of the claim, does not appear to be taught or suggested by Vigg.

Claim 7 states in part, “wherein a surface defined by the cavity is configured to bond to the simulated decay material.” The above-quoted feature of claim 7, in combination with the other features of the claim, does not appear to be taught or suggested by Vigg.

Claim 11 states in part, “wherein the simulated decay material comprises a resin material.” The above-quoted feature of claim 11, in combination with the other features of the claim, does not appear to be taught or suggested by Vigg.

Claim 12 states in part, “wherein the simulated decay material comprises a porous substance.” The above-quoted feature of claim 12, in combination with the other features of the claim, does not appear to be taught or suggested by Vigg.

Claim 16 states in part, “wherein the simulated decay material is homogeneous.” The above-quoted feature of claim 16, in combination with the other features of the claim, does not appear to be taught or suggested by Vigg.

Claim 17 states in part, “wherein the simulated decay material is curable.” The above-quoted feature of claim 17, in combination with the other features of the claim, does not appear to be taught or suggested by Vigg.

Claim 21 states in part, “wherein the simulated decay material is radiolucent.” The above-quoted feature of claim 21, in combination with the other features of the claim, does not appear to be taught or suggested by Vigg.

Claim 22 states in part, “wherein the simulated decay material is radio-opaque.” The above-quoted feature of claim 22, in combination with the other features of the claim, does not appear to be taught or suggested by Vigg.

Claim 23 states in part, “wherein the simulated decay material is of uniform hardness.” The above-quoted feature of claim 23, in combination with the other features of the claim, does not appear to be taught or suggested by Vigg.

Amended claim 36 describes a method of forming dental caries in an artificial tooth that includes, but is not limited to, the feature of: “cutting a cavity in an artificial tooth”. Support for the amendment to claim 36 is found at least in Applicant’s specification on page 6 lines 11 and 12, which states: “A defect of a desired character may be formed in the tooth with an appropriate cutting or drilling instrument.”

As discussed above, Vigg appears to mold the cavity in the model tooth. Therefore, at least the feature of claim 36 of “cutting a cavity in an artificial tooth”, in combination with the other features of the claim, does not appear to be taught or suggested by Vigg. Applicant requests removal of the anticipation rejection of claim 36.

E. **The Claims Are Not Obvious Over Vigg In View of Hayka et al. Pursuant To 35 U.S.C. §103(a)**

Claims 3, 4, and 26-33 were rejected under 35 U.S.C. §103(a) as being unpatentable over Vigg in view of U.S. Patent No. 5,688,118 to Hayka et al. (hereinafter “Hayka”). Applicant respectfully disagrees with these rejections.

To reject a claim as obvious, the Examiner has the burden of establishing a *prima facie* case of obviousness. *In re Warner et al.*, 379 F.2d 1011, 154 USPQ 173, 177-178 (C.C.P.A. 1967). To establish a *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP §2143.03.

Whether or not “a particular combination might be ‘obvious to try’ is not a legitimate test of patentability.” *Id.* at 1599, citing *In re Geiger*, 815 F.2d 868, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987) and *In re Goodwin*, 576 F.2d 375, 377, 198 USPQ 871, 881 (CCPA 1981). Consequently, it is not permissible for the Examiner to “use hindsight reconstruction to pick and chose among isolated disclosures in the prior art to deprecate the claimed invention.” *Id.* at 1600.

Claims 3, 4, and 26-33 each describe a combination of features including: “an artificial tooth, ... simulated decay material in a portion of the cavity”. As discussed above in section D, Vigg does not appear to teach or suggest at least the above-quoted feature of “simulated decay material in a portion of the cavity”. Vigg does not appear to teach or suggest at least the above-quoted features in combination with the other features of claims 3, 4, and 26-33.

In addition, Hayka does not appear to teach or suggest at least the above-quoted features of claims 3, 4, and 26-33 in an artificial tooth. Hayka appears to show a human tooth with cavities in FIGS 1-3. Hayka appears to show an artificial tooth in FIG. 4. The description in the specification of the artificial tooth states: “artificial tooth 58 is simulated as being divided into at least a first simulated region 82 simulating a substance of a first hardness (e.g., enamel), and a second simulated region 84 simulating a substance of a second hardness (e.g., dentin), the first

hardness is harder than the second hardness.” (column 10, lines 26-29). Hayka does not appear to teach or suggest a simulated tooth having simulated decay material in a portion of a cavity. The combination of cited art does not appear to teach or suggest all of the features of the rejected claims. Applicant requests removal of the obviousness rejections of claims 3, 4, and 26-33.

**F. The Claim Is Not Obvious Over Vigg In View of OFFICIAL NOTICE Pursuant To 35 U.S.C. §103(a)**

Claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over Vigg in view of OFFICIAL NOTICE. Applicant respectfully disagrees with these rejections.

As discussed above in Section D, Vigg does not appear to teach or suggest all of the features of independent claim 1. Applicant requests removal of the rejection of claim 8.

Claim 8 states in part, “wherein a surface defined by the cavity is textured.”

Reference is made to column 1, lines 42-45 of Vigg. These lines state: “it is an object of the invention to provide a multi-element tooth model accurately simulating in its elements the color, texture, hardness and drilling qualities, of corresponding elements of an actual tooth.” The term “texture” in the context of Vigg appears to refer to the “disposition or manner of union of the particles of a body or substance”, not to the “visual or tactile surface characteristics” as the word “textured” is used in claim 8. Vigg does not appear to teach or suggest an artificial tooth having a cavity, wherein a surface defined by the cavity is textured.

The Office Action states: “Examiner takes Official Notice that it is well known in the art of dentistry that the insides of cavities include texturing.” That the insides of cavities in a human tooth include texturing seems to be irrelevant. Claim 8 is directed to an artificial tooth. In claim 8, the artificial tooth includes texturing on a surface defined by the cavity. The combination of Vigg and the Examiner’s Official Notice does not appear to teach the combination of features of claim 8. Applicant requests removal of the obviousness rejection of claim 8.

**G. The Claims Are Not Obvious Over Vigg In View of Stein Pursuant To 35 U.S.C.  
§103(a)**

Claims 9 and 10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Vigg in view of U.S. Patent No. 3,846,011 to Stein (hereinafter “Stein”). Applicant respectfully disagrees with these rejections.

As discussed above, Vigg does not appear to teach or suggest all of the features of independent claim 1 or of an artificial tooth with a cavity “wherein a surface defined by the cavity is textured.” In addition, Vigg and Stein do not appear to teach or suggest all of the features of rejected claims 9 and 10.

Claim 9 states in part, “wherein a surface defined by the cavity is textured with an etching solution.” Claim 10 states in part, “wherein a surface defined by the cavity is textured with an etching solution, and wherein the etching solution comprises an acid.”

The Office Action states:

Vigg does not disclose expressly that a surface defined by the cavity is textured with an etching solution, and wherein the etching solution comprise an acid. Stein teaches texturing the surface of plastic using acid etching (*col. 1, 21-24*).

Stein states: “In accordance with this invention, there is provided a combination chalkboard-rear projection screen which comprises a glass panel having a ceramic enamel frit fused to one side of the glass.” (Stein, column 1, lines 61-64). Since the art of Vigg is in the area of a dental model and the art of Stein is in the area of chalkboards that are useable as rear projection screens, Section 2141.01(a) of the MPEP entitled “Analogous and Nonanalogous Art” appears to be applicable.

The techniques of Stein to make a chalkboard-rear projection screen would not have logically commended itself to an inventor’s attention in considering his problem of making a

model of dental caries. *Wang Laboratories Inc. v. Toshiba Corp.*, 993 F 2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993). There is no apparent motivation or suggestion in Vigg or Stein to combine the disclosures to form a textured surface in a cavity of an artificial tooth. As such, Applicant respectfully requests the removal of the rejection of claims 9 and 10.

**H. The Claim Is Not Obvious Over Vigg In View of Sugiura et al. Pursuant To 35 U.S.C. §103(a)**

Claim 13 was rejected under 35 U.S.C. §103(a) as being unpatentable over Vigg in view of U.S. Patent No. 5,674,930 to Sugiura et al. (hereinafter “Sugiura”). Applicant respectfully disagrees with this rejection.

As discussed above, Vigg does not appear to teach or suggest all of the features of independent claim 1. In addition, the combination of Vigg and Sugiura does not appear to teach or suggest all of the features of the rejected claim.

Claim 13 states in part, “porous substance, and wherein the porous substance comprises pumice.” The Office Action states: “Vigg does not disclose expressly the porous substance comprises pumice. Sugiura discloses a thermoplastic resin (*col. 3, 307*) using inorganic fillers (*col. 12, 59*) like pumice (*col. 13, 2*).”

Sugiura states: “The present invention relates to a thermoplastic resin composition having excellent characteristics such as impact resistance and coatability, and particularly to a resin composition to be used as a material for resin molded articles such as a bumper of an automobile.” (Sugiura, column 1, lines 13-16). Since the art of Vigg is in the area of model teeth and the art of Sugiura is in the area of automobile parts, Section 2141.01(a) of the MPEP entitled “Analogous and Nonanalogous Art” appears to be applicable.

The automobile parts filler of Sugiura would not have logically commended itself to an inventor’s attention in considering selection of porous substances to be used in a model of dental caries. *Wang Laboratories Inc. v. Toshiba Corp.*, 993 F 2d 858, 26 USPQ2d 1767 (Fed. Cir.

1993). See MPEP 2141.01(a). There is no apparent motivation or suggestion in Vigg or Sugiura to combine fillers for automobile parts with a model of dental caries. Applicant respectfully requests removal of the obviousness rejection of claim 13.

**I. The Claim Is Not Obvious Over Vigg In View of Doret Pursuant To 35 U.S.C. §103(a)**

Claim 14 was rejected under 35 U.S.C. §103(a) as being unpatentable over Vigg in view of U.S. Patent No. 2,256,667 to Doret (hereinafter “Doret”). Applicant respectfully disagrees with this rejection.

As discussed above, Vigg does not appear to teach or suggest all of the features of independent claim 1. In addition, the combination of Vigg and Doret does not appear to teach or suggest all of the features of the rejected claims.

Claim 14 states in part, “wherein the simulated decay material comprises coloring.” The above-quoted feature of claim 14, in combination with the other features of the claim, does not appear to be taught or suggested by the cited art.

**J. The Claims Are Not Obvious Over Vigg In View of Fukunishi Pursuant To 35 U.S.C. §103(a)**

Claims 15 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Vigg in view of U.S. Patent No. 6,084,005 to Fukunishi et al. (hereinafter “Fukunishi”). Applicant respectfully disagrees with these rejections.

As discussed above, Vigg does not appear to teach or suggest all of the features of independent claim 1. In addition, the combination of Vigg and Fukunishi does not appear to teach or suggest all of the features of the rejected claims.

Claim 15 states, “wherein the simulated decay material comprises food coloring.” The above-quoted feature of claim 15, in combination with the other features of the claim, does not appear to be taught or suggested by the cited art.

Claim 20 states in part, “wherein the simulated decay material is detectable by caries detecting stain.” The above-quoted feature of claim 20, in combination with the other features of the claim, does not appear to be taught or suggested by the cited art.

**K. The Claims Are Not Obvious Over Vigg In View of Muller et al. Pursuant To 35 U.S.C. §103(a)**

Claims 18 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Vigg in view of U.S. Patent No. 5,070,165 to Muller et al. (hereinafter “Muller”). Applicant respectfully disagrees with these rejections.

As discussed above, Vigg does not appear to teach or suggest all of the features of independent claim 1. In addition, the combination of Vigg and Muller does not appear to teach or suggest all of the features of the rejected claims.

Claim 18 states in part, “wherein the simulated decay material is light curable.” The above-quoted feature of claim 18, in combination with the other features of the claim, does not appear to be taught or suggested by the cited art.

Claim 19 states in part, “wherein the simulated decay material is curable with visible light.” The above-quoted feature of claim 19, in combination with the other features of the claim, does not appear to be taught or suggested by the cited art.

L. **The Claims Are Not Obvious Over Vigg In View of Turdiu et al. Pursuant To 35 U.S.C. §103(a)**

Claims 24 and 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Vigg in view of U.S. Patent No 6,164,966 to Turdiu et al. (hereinafter “Turdiu”). Claims 34 and 35 were rejected under 35 U.S.C. §103(a) as being unpatentable over Vigg in view of Hayka in further view of Turdiu. Applicant respectfully disagrees with these rejections.

Whether or not “a particular combination might be ‘obvious to try’ is not a legitimate test of patentability.” *Id.* at 1599, citing *In re Geiger*, 815 F.2d 868, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987) and *In re Goodwin*, 576 F.2d 375, 377, 198 USPQ 871, 881 (CCPA 1981). Consequently, it is not permissible for the Examiner to “use hindsight reconstruction to pick and chose among isolated disclosures in the prior art to deprecate the claimed invention.” *Id.* at 1600.

As discussed above, Vigg does not appear to teach or suggest all of the features of independent claim 1. Also as discussed above, Vigg in light of Hayka does not appear to teach or suggest all of the features of independent claim 26. The combination of Vigg and Turdiu; or the combination of Vigg, Hayka and Turdiu does not appear to teach or suggest all of the features of the rejected claims.

Claims 24 and 34 state in part, “wherein an outer layer of simulated decay material is softer than an inner layer of simulated decay material.” Claim 25 and 35 state in part, “wherein an inner layer of simulated decay material has a greater hardness than an outer layer of simulated decay material.”

The Office Action States:

Vigg does not disclose expressly that an outer layer of simulated decay material is softer than an inner layer of simulated decay material (and thus the inner layer has a greater hardness than the outer layer, as in claim 25). Turdiu discloses that in an actual caries-infected tooth an outer layer of decay material (*demineralization zone 33* (col. 4, 55-56) can be softer than an inner layer of

decay material (transparent dentin 35 (col. 4, 56) *also know as sclerotic dentin*). It would benefit the model of Vigg to use the teaching of Turdiu as a basis for simulating decay material because Turdiu teaches how decay material is in a real tooth.

The rejected claims are directed towards artificial teeth. Artificial teeth model certain properties and/or characteristics of real teeth. It is not obvious to incorporate properties and/or characteristics of the actual object into the model of the object that have previously not incorporated in a model of the object. Otherwise, by definition, a model cannot be non-obvious because the actual object being modeled already has the known properties and/or characteristics being incorporated into the model. Claims 24, 25, 34 and 35 incorporate material into the artificial tooth that is not taught or suggested by Vigg or the combination of Vigg and Hayka. Turdiu does not teach or suggest applying the real characteristics of teeth to a model. The combination of Vigg and Turdiu; or the combination of Vigg, Hayka and Turdiu do not appear to teach or suggest at least the above-quoted features of the claims, in combination with the other features of the claims. Applicant requests removal of the obviousness rejection of claims 24, 25, 34 and 35.

N. **Additional Remarks**

Applicant believes that the claims are in condition for allowance. Applicant respectfully requests favorable reconsideration.

Applicant believes no fees are required for the filing of this response. If an extension of time is necessary, Applicant hereby requests the appropriate extension of time. If any fees are required, please charge those fees to Meyertons, Hood, Kivlin, Kowert & Goetzel, P.C. Deposit Account Number 50-1505/5660-01102/EBM.

Inventor: Thomas D. Marshall  
Appl. Ser. No.: 10/617,484  
Atty. Dkt. No.: 5660-01102



Respectfully submitted,



Eric B. Meyertons  
Reg. No. 34,876

Attorney for Applicant

MEYERTONS, HOOD, KIVLIN, KOWERT, & GOETZEL, P.C.  
P.O. BOX 398  
AUSTIN, TX 78767-0398  
(512) 853-8800 (voice)  
(512) 853-8801 (facsimile)

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